



accessing information: The Internet— A Highway

by Marge Hocter

IF YOU HAD TO GO TO A remote area of the country and live for 4 months with only the resources and tools available in the early 1600s and you could take one modern item with you, what would it be?

One of the families who participated in the PBS series *Colonial House*, a reality TV show set in 1628, was interviewed by a local newspaper upon their return to modern life. After enduring months of hardships created by the lack of modern resources and conveniences, they were asked, "If you could have brought one item from today with you during your colonial stay, what would it have been?" The adults answered with practical items, such as a chainsaw and a modern stove. The teenager would have taken a cell phone, and the 10-year-old daughter said she would have taken a computer. Most adults would consider these electronic devices a luxury; most youths see them as a necessity.

That interview illustrates what has become known as the "Digital

Divide." Marc Prensky (2004) uses the term "digital natives":

I call this generation the "digital natives," in contrast to the "digital immigrants"—those of us who are older, and who arrived at the digital shores later in life. This distinction is important because those of us who were not "born into" the technology—no matter how fluent we become with it—are different from the "natives." . . . As digital natives, they have grown up with electronic media; their focus is different than their parents and teachers who are "digital immigrants." (Learning Games section, para. 6)

Ian Jukes feels strongly that we, as "digital immigrants," must assume the responsibility of ensuring that students are prepared to be effective and productive and have the tools, vocabulary, and skills to function as

lifelong learners, participants, and contributors in the 21st century (Dorsaj & Jukes, 2004).

David Thornburg (2003) warns us that we must prepare our learners for their future, not for our past. There has been a profound shift in the skills necessary for success in the modern world. Our students' world is radically different than the one in which most of their teachers grew up, and the role the Internet plays in their lives cannot be understated.

Gifted Learners and Technology

There is a wealth of research regarding characteristics of gifted learners. Delp and Martinson (1974) defined characteristics and resulting behaviors in gifted children, and many other researchers have produced lists of characteristics common in gifted learners. These lists include items such as intense curiosity, ability to learn rapidly, a tendency to want to focus and delve into a topic, and advanced vocabulary. Clark (1988) listed not



or a Maze?

only characteristics of gifted learners, but also needs that accompany those characteristics, including the need

- to be exposed to new and challenging information;
- to be exposed to varied subjects and concerns;
- to be allowed to pursue ideas as far as their interests take them;
- to be exposed to ideas at rates appropriate to the individual's pace of learning; and
- to pursue interests beyond allotted time spans.

Although teachers have done their best to provide necessary resources, it is difficult to imagine how any teacher could possibly meet all of those needs in a student or group of students using only print resources. Textbooks are not enough, school libraries often do not have the sophisticated references to meet a gifted student's needs, and the next avenue, the public library, even if easily accessible, often lacks specialized resources.

Now however, the Internet is

widely available, most online resources are free, and it is relatively easy to log on and find information. It basically comes without a manual, and consequently a majority of our student Internet users are self-taught. Even though our students think differently, they do not necessarily have the abilities they need to navigate the maze of their information-rich world successfully. High on the list of these essential skills is information literacy, "The ability to access, evaluate, organize, manipulate, and present information (including electronic information)" (British Columbia Ministry of Education, 1996). An information-literate individual is able to

- determine the extent of information needed;
- access the needed information effectively and efficiently;
- evaluate information and its sources critically;
- incorporate selected information into his or her knowledge base;
- use information effectively to accomplish a specific purpose; and

- understand the economic, legal, and social issues surrounding the use of information and access and use information ethically and legally (American Library Association, 2004).

Incorporating the Internet Into the Core Curriculum

The Internet is often called "The Information Highway," a metaphor that implies that there is a straight, clearly mapped path to obtaining information. In reality, it is more like a maze with twists and turns and many dead ends. Efficient navigation strategies must be taught; they will not be acquired through osmosis.

Schools with a strong information literacy component are the exception, rather than the rule. Many educators feel the pressure of covering the required curriculum, meeting the standards, and preparing students for achievement tests, and they feel that they don't have time to teach anything else. It is a given that students

must acquire the basics and meet the national, state, and local standards; however, attaining these goals cannot be at the expense of essential 21st-century skills. The current trend of meeting mandated core standards indeed prepares students for our past, not their future. But, it doesn't have to be either core curriculum or information literacy. With planning, information skills can be embedded in a differentiated curriculum that meets both standards for gifted education and required core standards.

Information literacy is not a separate subject or an add-on. Teaching research skills without also teaching the skills to use online resources is no longer acceptable.

Today's youth will grow up and work in a world that gives them access to massive amounts of information. Anyone can publish any version of the truth. The Internet is the wild, wild West of information, and there is no sheriff in town. It is essential that students learn information literacy: how to access and validate information and understand the organization of information . . . if students do not understand the basic grammar of the Internet, they will be manipulated by people who do. (November, 2001)

Since student proficiency in information literacy—including search strategies, evaluation of Web sites, and the organization and use of information—must be a goal for educators, the obvious questions that must be answered are “When?” and “How?” One answer is to incorporate online research skills into traditional assign-

ments. Internet assignments allow for mastery of content, as well as higher level thinking skills, integration of depth and complexity into core content, and advanced research and organizational skills. The following are some suggested activities for gifted learners that incorporate online research skills:

- Instead of a typical book report, students might go online and read reviews of a book and write a critique of these reviews. (*analysis of point of view, judge with criteria, determine fact from opinion*)
- In social studies, students might take a topic and use it to compare search engines or to evaluate Web sites in depth. (*critique, analysis of patterns, trends, structure*)
- Science students might take advantage of the opportunity to interact with an online expert to expand information collected from print material. (*in-depth study, interview skills, organization of information*)

Information Literacy Standards

In 2003, the American Association of School Librarians published The Information Literacy Standards:

- *Standard 1:* The student who is information literate accesses information efficiently and effectively.
- *Standard 2:* The student who is information literate evaluates information critically and competently.
- *Standard 3:* The student who is information literate uses information accurately and creatively.

Standard 1: Access

Overhear a conversation between teenagers and you will quite possibly

hear a reference to what they have “googled” recently. Google, the name of a popular search engine (<http://www.google.com>), has become a frequently used verb (Duffy, 2003), illustrating just how interconnected the Internet is with daily life, especially for children and adolescents.

So, if searching the Internet is commonly practiced by students now, what is the problem? The concern is that many of these self-taught students can access and use the Internet, but they don't know how to find or use the capabilities of various search engines and they don't have the skills to perform an effective search. They are going through the maze without a map or navigation skills.

While Google is an excellent search engine, there are many others, and not all search engines have the same features.

Meta search engines. These search engines, which include Metacrawler (<http://www.metacrawler.com>) and Dogpile (<http://www.dogpile.com>), collect the top hits from other search engines and compile them in two formats. In one format, a student can view the “hits” in order of relevance regardless of search engine. The other format provides a list that has been categorized by the top hits from each search engine. A meta search engine can be helpful in attempting to find popular sites for the selected subject.

Kid search engines. Search engines such as Ask Jeeves for Kids (<http://www.ajkids.com>), Yahoo!igans! (<http://www.yahoo!igans.com>), and Kids Click! (<http://sunsite.berkeley.edu/KidsClick!>) filter material to make their hits “kid safe.” This can be helpful if the student is searching for information typically researched by young students. Gifted students often become frustrated with “kid safe” search engines because sophisticated topics are

often not included; they have to go to a regular search engine to find sources for topics they are researching.

Directories. Some search engines feature directories—topics listed by category that can be accessed directly, rather than by performing a search. Most directories feature popular topics such as travel, entertainment, health, and home. Some also include academic topics such as science, social studies, and the arts.

Advanced search strategies. Search engines operate on a system called Boolean logic. Boolean logic refers to the logical relationship among search terms, and is named for the British-born Irish mathematician George Boole (University of Albany, 2004). Some educators feel that students, gifted students in particular, should learn how to do “Boolean searches.” Most, however, feel that, while beneficial, this skill is not necessary. Many search engines have an advanced search feature that allows the student to narrow their searches by a variety of criteria such as a word or phrase, date posted, or file format. Some have a tutorial section that provides a guide to the search process.

Figure 1 is an example of a chart that could be completed by students. Students could select three or four search engines to search a topic from the curriculum, analyze both the features on a simple search and the elements included in the advanced search section. In an assignment like this, students are working with curriculum content *and* they are discovering the intricacies of various search engines. The search engines listed in Figure 1 were chosen to provide a variety of features; they do not represent all of the quality search engines available. All are free to the user.

There are also fee-based search engines designed specifically for educa-

Search Engine	URL	Comments
Alta Vista	http://www.altavista.com	
Ask Jeeves	http://www.ask.com	
Ask Jeeves Kids	http://www.ajkids.com	
Awesome Library	http://www.awesome-library.org	
Dogpile	http://www.dogpile.com	
Google	http://www.google.com	
Hot Bot	http://www.hotbot.com	
KidsClick!	http://sunsite.berkeley.edu/KidsClick!	
Metacrawler	http://www.metacrawler.com	
Yahoo!	http://www.yahoo.com	
Yahooligans!	http://www.yahooligans.com	

Figure 1. Search engines

tion that include special tools for teachers. Two examples are Grokker (<http://www.grokker.com>) and netTrekker (<http://www.nettrekker.com>). Grokker has a graphic interface—a search reveals a graphic organizer with the results categorized. One of netTrekker’s many features is that its Web sites are all teacher-evaluated and -rated. They can be searched by subject, grade level, and state standard.

Standard 2: Evaluation

An extensive list of sources that provide strategies for evaluating Web sites can be found at the Cornell

University site (<http://www.library.cornell.edu/olinuris/ref/research/webeval.html#rank>). A Web site evaluation form designed for use in classrooms is available from Kathy Schrock’s Guide for Educators through Discovery School.com (<http://school.discovery.com/schrockguide>).

Although the lists from different sources vary slightly, the following criteria are commonly suggested:

- Who authored the page? What are his or her qualifications?
- What organization or company sponsors the Web site?
- Is there a bias?

- Is the information dated? Is current information important?
- How can information be verified?
- Does the page contain satire, propaganda, misinformation, or disinformation?

Can students determine the answers to these questions for each Web site they use as a reference? One useful tool is the understanding of the URL (Uniform Resource Locator, or Web site address.) Information about a Web site can be obtained from the address before visiting the site. The address or URL is divided into sections. The URL for a page in the University of California at Berkeley's Finding Information on the Internet: A Tutorial (<http://www.lib.berkeley.edu/TeachingLib/Guides/Internet/Evaluate.html>) provides the following information:

- *http*—Hyper Text Transfer Protocol: Protocol for moving files across the Internet.
- *www*—World Wide Web. A system of Internet servers that use http to transfer information.
- *lib.berkeley*—The first part of the address following www. is the server—the entity that is publishing the information—which in this case is the Library at Berkeley.
- *.edu*—The category is .edu (education) indicates a higher education site. This page was created by a university faculty member or student.
- */TeachingLib/Guides/Internet/Evaluate*—Each indicates a new folder.
- *.html*—Hypertext Mark Up Language, the language used to create hypertext documents.

An important element in the

Features Students Might Investigate for Each Search Engine

- Must the spelling be exact?
- Is it easy to use?
- Are advanced search strategies available?
- Can the user narrow search by date Web site was created/updated?
- Is it filtered for use by young students?
- If filtered is sophisticated content available?
- Are there “kid-safe” links?
- Is reading level specified?
- Is it a meta search engine?
- Is there a directory?
- Are suggestions given to assist with refining the search?
- Is there a tutorial on search strategies?
- Can the user search for pictures?

URL is the three-letter category code that follows the server name. Students should know who sponsors the Web sites they access. An analysis of the URL, particularly the category code, will provide useful information.

Commercial (.com). This site is sponsored by a business, and the main goal is to make a profit either by selling a product or by selling advertising based on a significant number of “hits” or visits to that site. Commercial companies’ and new organizations’ Web sites are .com sites.

Organization (.org). An organization by definition has a bias. They have a reason for being, and it is likely that the information found on their site reflects that bias. That does not mean that the information is not

valid—it may or may not be—but it also may be incomplete or less than objective. Students who use a .org site as a reference must be aware of who the organization is and what their mission is. They can judge the information they use when they are aware of the source. In many endeavors, students should be required to visit a site with an alternate point of view before using the information.

Higher education (.edu). Both college and university teachers are represented on .edu sites. In most cases, the material is accurate, but there are no guarantees. Student work may not always be closely monitored before it is put on the site, and professors have the right to post material to the site that is not necessarily in their area of expertise and to link to sites that reflect their own personal or political bias. Students should not use any material from the Internet without at least some evaluation of the content, no matter what the source.

Government (.gov). Many branches and departments of the government have Web sites. All of the material on a .gov site is copyright free. It can be used for research; pictures and video clips can be downloaded and used in multimedia projects. There is a wealth of information available on a variety of subjects, particularly science and social studies.

Tilde (-). A tilde in a URL indicates that a group or, more often, an individual is using space on a larger network. These individuals may or may not be posting information in their area of expertise. Students should always attempt to discover who authored the site and how that person’s background relates to the information being posted. Unfortunately, this information is sometimes not available or, if available, it may be deliberately misleading. Because the likelihood of

finding inaccurate information is higher on these sites, all information obtained should be verified by checking another site or print material.

Standard 3: Use of Information

Once the information is obtained, how will it be used? It should be used as a resource—not plagiarized—and the reference source should be cited. Teachers are often frustrated by students who, in spite of being told time and time again to use their own words, continue to copy. Many students do not really understand the ethical considerations of using someone else's work, especially if it comes from the Internet. In addition, teachers often find that their students do not know how to convert existing text into their own words. Although teachers teach note-taking skills, a number of students need to review them again each year so that they don't revert back to copying word for word or, worse, copying and pasting from the Internet right into their own document. It is easier to plagiarize than ever before, and plagiarism in student work is sometimes hard to detect.

An online resource to check student work for originality is one solution to that problem. One such fee-based online service is called Turnitin.com (<http://www.turnitin.com>). A teacher submits a student paper and Turnitin checks it against its database of 4.5 billion pages. If the work is not original, the source of the information is provided to the teacher.

Resources for citing references are also readily available online. A keyword search using "citing resources" yields a number of Web sites with examples from guidelines such as the Modern Language Association

(MLA), the American Psychological Association (APA), and *The Chicago Manual of Style*.

Objective/Assignment

Naturally, not every assignment can include extensive time for teaching research skills. Teachers should be clear in stating the objective before assigning a project. If the main objective is for students to create a final product, then it is more efficient to provide a list of links to specific preselected Web sites for research, assign a search on netTrekker where sites are preselected and evaluated, leave bookmarks on the Web browser that students can click to access, or have them to do an online Webquest assignment where the process and links to Web resources are all included in the lesson (<http://webquest.sdsu.edu>). In these examples, the resources are provided, and the focus is on the content of the report or project.

If developing information-literacy skill is to be a part of the process, student activities that allow them to search efficiently and make intelligent choices must be included. Not every research assignment needs to be completed into a final essay or report. If your objective is to teach research skills and strategies, examples of a final product might include the following:

- a log of search engines and Web sites used to locate information on a core topic and an evaluation of each as they relate to the topic;
- an annotated list of Web sites that have been evaluated according to specific criteria using a core topic as a vehicle for the search process; or
- a copy of an article from a Web

site with key words highlighted and notes taken and organized.

Which assignment would be the most beneficial for students: a research report or evidence of an efficient research process? The obvious answer is both. Traditionally, the completed product is the assignment of choice and the Internet research skills are not the focus. However, information literacy must be considered a basic skill. Even if only one project a year has as its focus information literacy, students will be developing a skill they will use for a lifetime.

"A differentiated curriculum can be the means to develop basic skills and concepts of the core curriculum. The integration of the core and differentiated curriculum is the only method that ensures the rights of gifted students to meet and exceed standards" (Kaplan, 2004). Differentiation requires resources beyond the textbook or the school library. The Internet is a valuable resource that allows in-depth investigation of an almost infinite variety of topics. But, in order to capitalize on this resource, students must be given the opportunity to master information-literacy skills. **GCT**

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applications are among the many tools offered to children for creative, meaningful, and challenging learning experiences. **GCT**

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